

Dental erosion related to dietary factors: A case report and literature review

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ABSTRACT

Background: Dental erosion is irreversible and chronic pathological dissolution of dental hard tissue caused by acids of non-bacterial origin. The acidic properties of certain foods result in potential dental enamel erosion.

Case Presentation: We present a 55-year-old man in this report complaining about the severe worn-out in anterior and posterior teeth over the past couple of years. History of frequent soft drinks, sour jounces, lemon water and Wine were noted in the Diet and Wear evaluation forms. Moreover, patient hardly brushing technique and immediately after the acidic intake can also consider as a factor that progresses erosive-abrasive teeth loss. On dental examination cupping, grooving and broad-base cervical lesions and other signs of erosive wear in incisal, occlusal and cervical area were noted in teeth.

Conclusion: The study seeks to demonstrate the important of making reliable diagnosis through patient interviewing by using various evaluation methods; including medical and dental history, diet analysis, wear question form. These findings lead us to causative factor connection between dental erosion and acidic diet type consumption. Also, limit the challenging to discriminate because of co-occurrence of erosion, attrition and abrasion during a clinical examination. However, the appropriate assessment in this case helps us to prevent new development erosions, stope further progression demineralization and implement the required treatment need according to the case.

Keywords: Dental erosion, Teeth wear, Soft drinks, Sour juices, Acidic diet

INTRODUCTION

Tooth wear is commonly used to describe the loss of dental hard tissues from the surfaces of the teeth caused by factors other than caries, developmental disorders, and trauma. Attrition, erosion, and abrasion are the common dental problem that cause teeth wear [1]

Dental erosion is characterized as tooth demineralization, as it occurs in caries, but due to chemical dissolution by acids not of bacterial origin. Erosion also compares to caries that grow with a subsurface lesion and retain the surface layer as long as the remains of subsurface structures are preserved [2].

The interaction of chemical, biological and behavioral factors is fundamental, which can lead to loss of occlusal morphology of teeth and might be progressively pulp damage in some severe cases, causing dentin hypersensitivity (Fig. 1) [4]. Thus, it is important to make a reliable diagnosis through patient interviewing and clinical examination that recognizes the etiological factors. The proper evaluation of each case can help to prevent enamel demineralization and implement the specified treatment need according to the case [5].

Clinical presentation and Diagnosis: A 55 years male patient presented to clinic with dental sensitivity and esthetic concern in upper and lower teeth, also suffering from dry mouth in morning. He described his job with long working hours with skipping meals in between work schedule and frequent drinking of acidic beverages including soft drinks, lemon water, wine, cider vinegar and sour juices. Moreover, patient hardly brushing technique and immediately after the food and drink acidic consumption. He denied anything significant with regards to allergic history and family history of dental problems. There was no history of gastroesophageal reflux and bruxism. Heat and cold sensitivity tests revealed normal results indicating that the patient experienced no dentin hypersensitivity.

On oral examination several initial and advanced cupping erosion teeth were noted. (Figure 2 &3). No signs of attachment loss were discovered by a thorough periodontal examination. The mucosa of the oral tract was moist, pink, and without lesions. No salivary gland enlargement has occurred bilaterally. Salivary tests were carried out to measure pH, buffering capacity and salivary flow, revealing normal salivary flow with a decrease in salivary pH and buffering capacity.

Salivary tests were carried out to measure salivary flow, pH, and buffering capacity (Figure 5), revealing

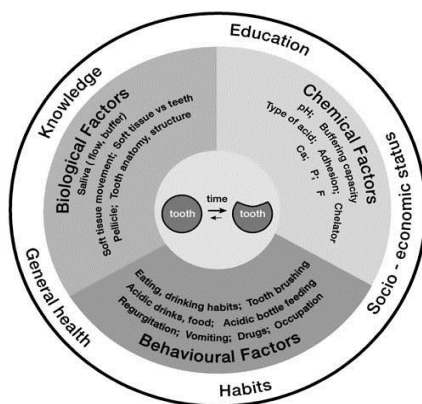


Fig.1 Interactions of the different factors for the development of dental erosion

It has become a critical dental health problem and recent publication researches have reported that the incidence of erosion has gradually increased over the latest years with significant effects on the long-term health of the dentition [2, 3]. Dental erosion is a multifactorial disorder:

normal salivary flow with a decrease in salivary pH and buffering capacity. Salivary tests were carried out to measure salivary flow, pH, and buffering capacity (Figure 5), revealing normal salivary flow with a

decrease in salivary pH and buffering capacity. Following figures depict the status of dental erosions.



Fig 2a



Fig 2b

Figure 2: Morphology of upper and lower jaws.



Fig 3a



Fig 3b

Figure 3: Depicting grooving, cupping and broad-base cervical lesions that are typical signs of erosive wear in incisal, occlusal and cervical areas of these teeth.

Clinical appearance is the most important feature for dental professionals when diagnosing dental erosion and sometime it is challenging to discriminate because of co-occurrence of erosion, attrition and abrasion during a clinical examination. Dietary history is an add on if taken properly with special emphasis on dietary lifestyle, oral habits and functional problems. In clinical examination, a simple scoring system, Basic Erosive Wear Examination (BEWE) was used with the diagnostic criteria of all current indices (Table 1), and the cumulative score is classified in complexity levels guiding the management of the condition (Table 2) [6].

Table 1: Criteria for Grading Erosive Wear (Bartlett & others)

Score	
0	No erosive tooth wear
1	Initial loss of surface texture
2*	Distinct defect, hard tissue loss <50% of the surface area
3*	Hard tissue loss ≥50% of the surface area

*In scores 2 and 3, dentin is often involved.

Table 2: Risk levels as a guide to clinical management

S.N.	Risk Level	Cumulative score of all sextants	Management
1	No	Less than or equal to 2	Routine observation and maintenance. Repeat at every 3-year intervals
2	Low	Between 3 and 8	Routine observation and maintenance.

			Oral hygiene and dietary assessment, and advice, routine maintenance and observation Repeat at 2-year intervals
3	Medium	Between 9 and 13	Oral hygiene and dietary assessment, and advice, identify the main aetiological factor(s) for tissue loss and develop strategies to eliminate respective impacts Consider fluoridation measures or other strategies to increase the resistance of tooth surfaces Ideally, avoid the placement of restorations and monitor erosive wear with study casts, photographs, or silicone impressions Repeat at 6–12-month intervals
4	High	14 and over	Oral hygiene and dietary assessment, and advice, identify the main aetiological factor(s) for tissue loss and develop strategies to eliminate respective impacts Consider fluoridation measures or other strategies to increase the resistance of tooth surfaces Ideally, avoid restorations and monitor tooth wear with study casts, photographs, or silicone impressions Especially in cases of severe progression consider special care that may involve restorations Repeat at 6–12-month intervals



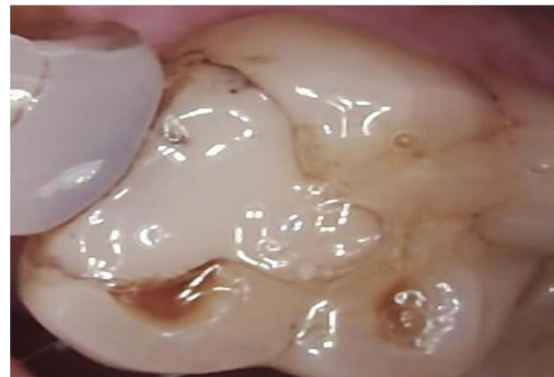
Score 1



Score 2



Score 3



Score 3

The clinical photos of the cupping erosion teeth show the different diagnosis grades according to (BEWE) in this patient. Finally, the patient's history and symptoms supported the nuanced diagnosis of dental erosion. On the one hand, without bacterial intervention, dental erosion is characterized as the chemical effect of acid. A smooth surface is part of the early stage of dental erosion. The advanced phases include the growth of enamel concavities, longer-than-width lesions, undulating margins, and an intact enamel boundary along the margin of the facial gum. The entire occlusal morphology of the tooth disappears in extreme cases of dental erosion [3, 4]. The erosion pattern is related to the degree of exposure of the dental tissue to acidic fluid. The patient likes keeping the drink around the vestibular groove and the drink's erosive acid may have demineralized the tooth's cervical region.

Etiology: It has long been established that once the oral ambient pH is below the critical level of 5.5, demineralization of dental enamel can occur. Mouth acids are derived from three primary bases: acidogenic bacteria, extrinsic acid and intrinsic acids. Prolonged contact with extrinsic and intrinsic acids on the surfaces of the teeth can cause dental erosion [7].

Extrinsic acids: Beverages, soft drinks and carbonated beverages, fruit juices, sports drinks, and wine have acidic pH less than 4 can cause dental erosions. Fruits rich in Vitamin C, berries and some drugs such as aspirin is also known to increase the extrinsic acids which can in turn lead to dental erosions.

Intrinsic acids: The existence of the highly acidic gastric juice in the oral cavity due to backflow of the gastric contents through the esophageal tract or gastrointestinal

disease may lead to dental erosion [8]. The acidic remnants are neutralized by saliva secretion and the oral pH is restored to normal. Low saliva flow rate and poor buffering capability are also found to be associated with the development of dental erosion due to autoimmune disorders such as Sjögren's syndrome, endocrine conditions such as hypothyroidism, drugs (e.g., antidepressants, antipsychotics, antihistamines, anticonvulsants) and radiotherapy [8].

In our patient extrinsic acid was indicated as the main etiological factor after analyzing the diet records and erosion analysis form. The patient used to consume soured fresh fruits, drinks (ex. orange juice), wine, lemon water and cider vinegar frequently and were the crucial daily erosive foods and beverages. Also, the patient was hardly brushing technique and immediately after the acidic intake can also consider as a factor that progresses erosive-abrasive teeth loss.

Prevention and Treatment: Restorative erosion management was planned for this patient with simultaneous monitoring of pain and dentine hypersensitivity. The treatment and preventive strategies were designed to minimize the progression to advanced lesions and to treat dentinal esthetic and functional complications. Erosions were treated with traditional methods such as material therapies. Direct composites were preferred over indirect (e.g., composites, ceramics, metals), as they were less invasive and were followed up during subsequent visits. With regards to preventive strategies which is of paramount importance in conjunction with intervention treatment was incorporated in the treatment plan. If the cause of teeth loss is intrinsic acid sources such as gastroenterologists, refer patients or encourage them to pursue proper medical treatment. If extrinsic acids were found to be causative factors leading to dental erosions, patient should be requested to decrease the amount and quantity of acidic drinks and foods to minimize the direct contact of teeth with acids. Additionally optimizing oral hygiene, brushing techniques, high fluoride tooth paste, stimulated salivary flow and timely frequent visits to dentists will halt the progression of erosions.

DISCUSSION

The clinical manifestation of dental erosion can present with cupping of the cusps in occlusal surfaces with change in contour and morphology based on the erosive phases. Attrition of teeth caused by physiological wear and tear and parafunctional habits like grinding or clenching can also mimic erosions of teeth. Attrition can be identified with typically flat, sharp borders and glossy appearance, whereas the clinical manifestation of erosion on smooth surfaces can present with fusion of the surface and undamaged border along the gingival margin. Abrasion can be predominantly distinguished from the smooth surface erosions by the etiological factors. Abrasion is mainly caused by traumatic oral hygiene habits through the daily improper brushing technique. Abfraction (Wedge-shaped lesion) also can distinguish from the smooth surface erosions by the location at the cervical margin and the coronal part typically has sharp margins and cuts at a right angle intact enamel surface [8]. Evidence also indicates that that erosive wear also predisposes to attrition, and that

the two mechanisms very often act together causing tooth surface loss [2]. Thus, it is essential to differentiate among these various types of tooth wear provide an insight on risk factors and causative factors in order to apply the proper prevention and intervention.

Dietary factors are the most common etiological factor involved in the production of dental erosion [9]. The normal extrinsic dietary instigators of dental erosion are vegetables, fruit juices and candies with high citric acid concentrations, carbonated drinks in which citric and phosphoric acids. Consumption of soft drinks has been seen as a potential problem in the changing world of globalization [10]. Different authors have pointed out that the decrease or loss of salivary buffering ability will lead to the enamel erosion process, the frequency and development of dental erosion in this regard [11, 12]. An acid challenge results in salivary salts (calcium, phosphate) under saturation and tooth demineralization occurs with dental enamel softening. These all factors long with wear leading to erosions require preventive measures and immediate treatment dentinal sensitivity, teeth function and esthetics by proper multidisciplinary approach towards the rehabilitation of the patients with dental erosion [13].

CONCLUSION

The overview and report show the importance of early diagnosis of dental erosion and the accurate evaluation of potential risk factors and their interplay. These facts are required to identify the etiologic agents from the initial stages in order to plan strategies in prevention the new development of the erosions, stop further progression and implant the appropriate intervention needs.

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